Case 3088

Doris verrucosa Linnaeus, 1758 (Mollusca, Gastropoda): proposed conservation of the generic and specific names by designation of a neotype

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Abstract. The purpose of this application is to conserve the prevailing usage of the generic and specific names of the Atlantic/Mediterranean nudibranch *Doris verrucosa* Linnaeus, 1758 by the designation of a neotype. The binomen is in long-accepted use for a well-known European and North American species, and *Doris* is the type genus of the family DORIDIDAE Rafinesque, 1815. However, *Doris verrucosa* had originally been introduced for one (or more) taxonomic species from the Indian Ocean; these probably belonged to the PHYLLIDIIDAE, which is placed in a different superfamily from the DORIDIDAE.

Keywords. Nomenclature; taxonomy; Gastropoda; Nudibranchia; DORIDIDAE; *Doris*; *Doris verrucosa*; *Doris derelicta*; *Doridigitata*; *Staurodoris*; Atlantic; Mediterranean.

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1. Linnaeus (1758, p. 653) erected the nudibranch genus *Doris* to contain the single species *D. verrucosa*, with the description:

"Doris. *Corpus oblongum, subtus planum. Tentacula ad os circiter octo.* [Body oblong, flattened ventrally. Eight tentacles surrounding the mouth].
verrucosa. *Doris corpore supra tuberculato.* [Dorsum with tubercles]
Rumph. mus. 38. Limax marina verrucosa.
Seb. mus. 2. t. 61. f. 5. Mitella verrucosa.
Habitat in Oceano.
Corpus oblongum, semicylindricum, convexum, extremitatibus rotundatis, supra verrucosum. Margo lateralis deflexus.
Pes ut in Limace, ovalis, oblongus margine plano. Os tentaculis brevissimis, circiter octo."

Linnaeus did not mention any specimen of *D. verrucosa* as having been seen by himself, and the description was probably based on the two references cited. The reference to Seba (1735, pl. 61, fig. 5) refers to an illustration of a nudibranch which is probably *Phyllidiella pustulosa* (Cuvier, 1804) (PHYLLIDIIDAE), a common tropical Indo-Pacific species. The other reference (Rumphius, 1705, p. 38) is a short description, not detailed enough to permit identification but which could possibly represent a phyllidiid nudibranch. If the present application is accepted the possible synonymy between *P. pustulosa* (Cuvier, 1804) and *D. verrucosa* Linnaeus, 1758 will be removed.

2. In a subsequent edition of the *Systema Naturae*, Linnaeus (1767, p. 1083) corrected the original description of *Doris* by stating that the tentacles [=gills]

surround the anus, not the mouth, and he expanded *Doris* to include three additional species. The description of, and bibliographical indications referring to, *D. verrucosa* were repeated with a minor change: "*D[oris] oblonga, corpore supra undique tuberculato*", and the habitat is now given as "Oceano Indico".

3. The name *Doris* has subsequently been applied to encompass nearly all nudibranchs of the order Doridida, which currently includes several superfamilies. However, the family PHYLLIDIIDAE is remarkable among dorid nudibranchs for having a dorsal or ventral anus not surrounded by gills, so that it is one of the few dorid families for which the name *Doris* has never been used.

4. Pennant (1777, p. 36) applied the name *Doris verrucosa* to a British species from Aberdeen, Scotland, at the same time providing a short description and an illustration (pl. 21, fig. 23). Pennant's application of the name *Doris verrucosa* differs from both Linnaeus's original concept and the modern application. Thompson & Brown (1984) identify the species described by Pennant as *Onchidoris bilamellata* (Linnaeus, 1767).

5. Cuvier (1804) discussed the doubtful identity of Linnaeus's nominal species, and (p. 467, pl. 1, figs. 4–6) applied the name *Doris verrucosa* to a dorid from "Ile de France" [Mauritius] which was known to him from preserved specimens. He commented that he used the name *D. verrucosa* because it well matched the Mauritian species even though Seba's illustration, referred to by Linnaeus, was that of a chiton (however, in stating this, Cuvier apparently confused Seba's pl. 61, fig. 4, which indeed represents a chiton, with fig. 5). The excellent quality of Cuvier's illustrations and the scientific influence of his writings probably explain why his authorship of the name *Doris verrucosa* was often cited by subsequent authors.

6. Rapp (1827, p. 517) used the name *Doris verrucosa* Linnaeus for a dorid from Naples, Italy, which in his opinion had the same characteristics as Linnaeus's and Cuvier's species but differed from that of Montagu; this reference to "Montagu" was probably an error for Pennant (see para. 4 above), because Montagu never used the name *Doris verrucosa* in any of his works. Following Rapp (1827) the name *Doris verrucosa* was applied by European zoologists (Delle Chiaje (1828, p. 129, 133, pl. 38, figs 14, 23); Philippi (1836, p. 104); d'Orbigny (1839, p. 39); and numerous subsequent authors) exclusively to the common Atlantic/Mediterranean nudibranch which is characterised by hemispherical tubercles on the notum, numerous unipinnate branchial leaves and long rhinophores. This very well-known species is distributed throughout the Mediterranean and the Atlantic European coast from the south coasts of the British Isles to the Azores (Thompson & Brown, 1984), and also on the eastern coast of North America (Franz, 1970).

7. Fischer (1867, pp. 7–8) recognized that the specific name *verrucosa* Linnaeus, 1758 originally referred to a species from the Indian Ocean and should not be used for the European species; he accordingly introduced the name *Doris derelicta* for the latter. The specific name *derelicta* Fischer, 1867, combined with *Doris* or *Doridigitata* (see para. 9 below), has been sporadically treated as valid since its original description (e.g. Lafont, 1868; Taslé, 1870; Beltremieux, 1884; Locard, 1886; Iredale & O'Donoghue, 1923). However, its usage has been discontinued in modern times.

8. The uncertainty of the identity of the species denoted by the name *Doris verrucosa* Linnaeus, 1758 was discussed by Bergh (1878, p. 579). Ignoring Fischer's

(1867) discussion and specific name *derelicta*, Bergh proposed to disregard Linnaeus's original references and to apply the name "*Doris verrucosa* L. Cuvier" to the European species. A somewhat similar and nomenclaturally unorthodox view was later held by Pruvot-Fol (1934, p. 236–239). She regarded Cuvier as "premier réviseur" of the name *verrucosa* and suggested that the European species be called "*Doris verrucosa* L. (Cuvier)"; she rightly noted that it would be "de gros inconvénients" to transfer the name *Doris* to the PHYLLIDIIDAE. Eliot (1910, p. 94) criticized Bergh's nomenclature, but, although he conceded "It is true that the animal [*Doris verrucosa*] cannot be recognized from Linnaeus' description", he continued to apply the name *Doris verrucosa* Linnaeus to the European species. Despite their differing opinions on how to cite the authorship of the name *Doris verrucosa*, Bergh, Eliot and Pruvot-Fol all agreed in applying it to the Atlantic/European species and with the single exception of Iredale & O'Donoghue (1923; see para. 9 below) their view prevailed throughout the 20th century. The name *Doris verrucosa* is in current general use for the European species in taxonomic works (e.g. Marcus & Marcus, 1967; Schmekel, 1968; Schmekel & Portmann, 1982; Thompson & Brown, 1984; Just & Edmunds, 1985), illustrated popular guides (e.g. Riedl, 1983; Cattaneo-Vietti, Chemello & Gianuzzi-Savelli, 1990; Picton & Morrow, 1994; Weinberg, 1994) and regional check-lists of marine molluscs (e.g. Cervera et al., 1988; Sabelli, Gianuzzi-Savelli & Bedulli, 1990; Seaward, 1990; Smith & Heppell, 1991). The species has also been the subject of investigations in the fields of cytology and karyology (Fodera, 1915; Mancino & Sordi, 1964; Ávila & Dufort, 1996) and chemistry (Ávila et al., 1990; Gavagnin et al., 1990; De Petrocellis et al., 1996). The name *Doris verrucosa* has not been applied to a species from the Indian Ocean since the very early 19th century (paras. 5 and 6 above).

9. The historical ambiguity in the application of the specific name *Doris verrucosa* has had consequences at genus level. D'Orbigny (1839, p. 39), discussing the nudibranchs of the Canary Islands, stated that the family DORIDIDAE contained several genera, and he divided *Doris* into discrete species groups which he treated as the subgenera *Doris* and *Doridigitata*. The latter contained the new species *D. bertheloti* from the Canary Islands, and "*Doris verrucosa* Linn" [in the European sense] was also placed in *Doridigitata*, even though according to modern rules this is automatically the type species of *Doris* (*Doris*) Linnaeus, 1758 by monotypy (so that *Doris* and *Doridigitata* are synonyms). Gray (1847, p. 164) fixed *Doris verrucosa* as the type species of *Doridigitata* (which he spelled as *Doris-digitata*); Iredale & O'Donoghue (1923, p. 229) mistakenly considered *D. bertheloti* to be the type species by monotypy. Since its original description the generic name *Doridigitata* has been used as valid only by Iredale & O'Donoghue (1923), who noted that this is "*Doris* of some authorities, not *Doris*, Linné, Syst. Nat., ed. 10, p. 653, 1758".

10. Bergh (1878, p. 578) rejected the name *Doridigitata* because he found it inappropriate, and introduced a new nominal genus *Staurodoris* to contain "*St. verrucosa* (Cuv.) M. mediterr.", *D. bertheloti*, and two other nominal species. The synonymy of *S. verrucosa* included "*D. verrucosa* L. Cuvier" and Bergh was evidently intending to use Linnaeus's name in the supposed sense of Cuvier; like other authors he ignored the fact that Cuvier had applied the name to a species from Mauritius. Iredale & O'Donoghue (1923, p. 229) subsequently designated "*Doris verrucosa*, Bergh, ex Cuvier" (i.e. *D. verrucosa* as interpreted by Bergh) as the type

species of *Staurodoris*, although they treated this generic name as a junior synonym of *Doridigitata*. Under Article 69.2.4 of the Code their action fixes the European species (denoted by its valid name) as the type species of *Staurodoris*, and if the present application is accepted the valid name of the species will be *D. verrucosa* Linnaeus, 1758 (and not *D. derelicta* Fischer, 1867). After its original establishment the name *Staurodoris* had a limited usage as a subgenus of *Doris* (Eliot, 1910), or as a full genus (*e.g.* Ihering, 1886; Gadzikiewicz, 1907). Neither *Doridigitata* nor *Staurodoris* has had any modern usage, whereas *Doris* has been consistently used in the recent literature for *D. verrucosa* (in the Atlantic/Mediterranean sense) and allied species (e.g. Thiele, 1931; Schmekel, 1968; Franc, 1968; Bouchet, 1977; Thompson, 1980; Ortea, Pérez-Sánchez & Llera, 1982).

11. The family-group name DORIDIDAE was introduced by Rafinesque (1815, p. 142; spelled as Doridia), based on *Doris* Linnaeus. Iredale & O'Donoghue (1923, p. 226), who rejected *Doris* as the valid generic name of the European species, logically also rejected the family name DORIDIDAE and erected DORIDIGITATIDAE based on *Doridigitata*. As far as we have ascertained, the name DORIDIGITATIDAE has not been used as valid since its original introduction, whereas DORIDIDAE is in wide general use.

12. The difficulties surrounding the applications of the name *Doris verrucosa* are obvious, and have been noted by those authors (Bergh, Eliot, Pruvot-Fol) who have explicitly favoured maintaining the long-established usage of the name for the European species. The authors (Fischer, Iredale & O'Donoghue) who rejected *Doris verrucosa* in favour of Fischer's (1867) *Doris* (or *Doridigitata*) *derelicta* did not apply the name *D. verrucosa* to a tropical species. We think that the only pragmatic solution to this very longstanding problem is to maintain current usage of both the generic and specific names by designating a neotype of *Doris verrucosa* that conforms to its application in the Atlantic/European literature. The nominal species *Doris derelicta* Fischer, 1867 was established to cover the same biological concept (para. 7) and is therefore a synonym. Since no type material of *D. derelicta* is known to exist it is advisable to make it an objective synonym by designating the neotype of *D. verrucosa* also the neotype of *D. derelicta*. A specimen from Castropol, Asturias (Atlantic coast of Spain) in the Muséum national d'Histoire naturelle, Paris, has the characters of *D. verrucosa* described in detail by Schmekel (1968), Ortea, Pérez-Sánchez & Llera (1982) and Thompson & Brown (1984), and it proposed that it be designated the neotype of both nominal species; it will be labelled accordingly.

13. The International Commission on Zoological Nomenclature is accordingly asked:

(1) to use its plenary power to set aside all previous fixations of type specimens for the nominal species *Doris verrucosa* Linnaeus, 1758 and *Doris derelicta* Fischer, 1867, and to designate as the neotype of both species the specimen in the Muséum national d'Histoire naturelle, Paris, mentioned in para. 12 above;

(2) to place on the Official List of Generic Names in Zoology the name *Doris* Linnaeus, 1758 (gender: feminine), type species by monotypy *Doris verrucosa* Linnaeus, 1758;

(3) to place on the Official List of Specific Names in Zoology the name *verrucosa* Linnaeus, 1758, as published in the binomen *Doris verrucosa* and as defined by the neotype designated in (1) above;

(4) to place on the Official List of Family-Group Names in Zoology the name DORIDIDAE Rafinesque, 1815, type genus *Doris* Linnaeus, 1758;

(5) to place on the Official Index of Rejected and Invalid Generic Names in Zoology the following names:
   (a) *Doridigitata* d'Orbigny, 1839 (a junior objective synonym of *Doris* Linnaeus, 1758);
   (b) *Staurodoris* Bergh, 1878 (a junior objective synonym of *Doris* Linnaeus, 1758);

(6) to place on the Official Index of Rejected and Invalid Specific Names in Zoology the name *derelicta* Fischer, 1867, as published in the binomen *Doris derelicta* and as defined by the neotype designated in (1) above (a junior objective synonym of *Doris verrucosa* Linnaeus, 1758;

(7) to place on the Official Index of Rejected and Invalid Family-Group Names in Zoology the name DORIDIGITATIDAE Iredale & O'Donoghue, 1923 (type genus *Doridigitata* d'Orbigny, 1839) (a junior objective synonym of DORIDIDAE Rafinesque, 1815).

References

Ávila, C., Ballesteros, M., Cimino, G., Crispino, A., Gavagnin, M. & Sodano, G. 1990. Biosynthetic origin and anatomical distribution of the main secondary metabolites in the nudibranch mollusc *Doris verrucosa*. *Comparative Biochemistry and Physiology*, **97B**: 363–368.

Ávila, C. & Durfort, M. 1996. Histology of epithelia and mantle glands of selected species of doridacean mollusks with chemical defensive strategies. *The Veliger*, **39**: 148–163.

Beltremieux, E. 1884. *Faune vivante de la Charente-Inférieure*. 147 pp. Mareschal et Martin, La Rochelle.

Bergh, R. 1878. Malacologische Untersuchungen. Theil 2, Band 2 (pp. 547–602, pls. 62–65) *in* Semper, C. (Ed.) *Reisen im Archipel der Philippinen*. Kreidel, Wiesbaden.

Bouchet, P. 1977. Opisthobranches de profondeur de l'Océan Atlantique: II - Notaspidea et Nudibranchiata. *Journal of Molluscan Studies*, **43**: 28–66.

Cattaneo-Vietti, R., Chemello, R. & Giannuzzi-Savelli, R. 1990. *Atlas of Mediterranean Nudibranchs*. 264 pp. La Conchiglia, Roma.

Cervera, J.L., Templado, J., García-Gómez, J.C., Ballesteros, M., Ortea, J., García, F.J., Ros, J. & Luque, A.A. 1988. Catálogo actualizado y comentado de los Opisthobranquios (Mollusca, Gastropoda) de la Península Ibérica, Baleares y Canarias, con algunas referencias a Ceuta y la Isla de Alborán. *Iberus*, suplemento **1**: 1–83, 5 pls.

Cuvier, G.L. 1804. Mémoire sur le genre *Doris*. *Annales du Muséum d'Histoire Naturelle*, **4**: 447–473 (with 2 pls.).

Delle Chiaje, S. 1841. *Descrizione e notomia degli animali invertebrati della Sicilia Citeriore osservati vivi negli anni 1822–1830*, vol. 2 (Molluschi Gasteropedi). 87 pp. Batelli, Napoli.

De Petrocellis, L., Orlando, P., Gavagnin, M., Ventriglia, M., Cimino, G. & Di Marzo, V. 1996. Novel diterpenoid diacylglycerols from marine molluscs: potent morphogens and protein kinase C activators. *Experientia*, **52**: 874–877.

Eliot, C. 1910. *A monograph of the British Nudibranchiate Mollusca: with figures of the species*, part 8 (suppl.). 198 pp., 8 pls. The Ray Society, London.

Fischer, P. 1867. Catalogue des Nudibranches et Céphalopodes des côtes océaniques de la France. *Journal de Conchyliologie*, (3)**15**: 5–15.

Fodera, E. 1915. Sulla funzione di secrezione dell'epitelio ghiandolare della vesicola di Swammerdam in *Doris verrucosa* L. *Monitore Zoologico Italiano*, **26**: 112–113.

Franc, A. 1968. Sous-classe des opisthobranches. Pp. 608–893 *in* Grassé, P.-P. (Ed.) *Traité de Zoologie, Anatomie, Systématique, Biologie*. Tome 5, Mollusques Gastéropodes et Scaphopodes (Fascicule 3). 1083 pp. Masson, Paris.

Franz, D. 1970. The distribution of the nudibranch *Doris verrucosa* Linne in the Northwest Atlantic. *The Nautilus*, **83**: 80–85.

Gadzikiewicz, W. 1907. Das plötzliche Auftreten einer vergleichweise grossen Zahl von Dorididae Cryptobrancheatae (*Staurodoris hrobetzkii* n. sp.) in den Meeresbuchten bei Sebastopol. *Biologisches Centralblatt*, **27**: 508–510.

Gavagnin, M., Spinella, A., Cimino, G. & Sodano, G. 1990. Stereochemistry of ichthyotoxic diacylglycerols from opisthobranch molluscs. *Tetrahedron Letters*, **31**: 6093 6094.

Gray, J.E. 1847. A list of the genera of recent mollusca, their synonyma and types. *Proceedings of the Zoological Society of London*, **15**: 129–219.

Ihering, H. von 1886. Zur Kenntniss der Nudibranchen der brasilianischen Küste. *Jahrbücher der Deutschen Malakozoologischen Gesellschaft*, **13**: 223–240.

Iredale, T. & O'Donoghue, C.H. 1923. List of British nudibranchiate Mollusca. *Proceedings of the Malacological Society of London*, **15**: 195–233.

Just, H. & Edmunds, M. 1985. *North Atlantic Nudibranchs (Mollusca) seen by Henning Lemche*. 170 pp. Ophelia Publications, Helsingor.

Lafont, A. 1868. Note pour servir à la faune de la Gironde contenant la liste des animaux marins dont la présence à Arcachon a été constatée pendant les années 1867 et 1868. *Actes de la Société Linnéenne de Bordeaux*, **26**: 1–14.

Linnaeus, C. 1758. *Systema Naturae*, Ed. 10, vol. 1. 824 pp. Salvii, Holmiae.

Linnaeus, C. 1767. *Systema Naturae*, Ed. 12, vol. 1. 1327 pp. Salvii, Holmiae.

Locard, A. 1886. *Prodrome de Malacologie Française. Catalogue général des Mollusques vivants de France. Mollusques marins*. 778 pp. Georg, Lyon.

Mancino, G. & Sordi, M. 1964. Richerche cariologiche in *Doris verrucosa* (Gasteropodi Opistobranchi) del litorale livornese. *Atti della Società Toscana di Scienze Naturali*, (B) **71**: 18–29.

Marcus, Ev. & Marcus, Er. 1967. American Opisthobranch mollusks, part 1. Tropical American opisthobranchs. *Studies in Tropical Oceanography*, **6**: 1 256.

Orbigny, A. d'. 1839. Mollusques. Pp. 1–72 *in* Mollusques, Échinodermes, Foraminifères et Polypiers . . . . Vol. 2, part 2 *in* Webb, P. B. & Berthelot, S. (Eds.), 1835-1850, *Histoire Naturelle des îles Canaries*. Paris.

Ortea, J., Pérez-Sánchez, J. & Llera, E. 1982. Moluscos Opistobranquios recolectados durante el Plan de Bentos Circuncanario. Doridacea, 1. *Cuadernos del CRINAS*, **3**: 1–48, pls. 1–2.

Pennant, T. 1777. *British Zoology*, vol. 4. 380 pp. Wilkie & Robinson, London.

Philippi, R.A. 1836. *Enumeratio molluscorum Siciliae cum viventium tum in tellure tertiaria fossilium quae in itinere suo observavit*. 303 pp., 28 pls. Schropp, Berlin.

Picton, B.E. & Morrow, C.C. 1994. *A field guide to the nudibranchs of the British Isles*. 143 pp. Immel, London.

Pruvot-Fol, A. 1934. Les doridiens de Cuvier publiés dans les Annales du Muséum en 1804. Etude critique et historique. *Journal de Conchyliologie*, (4)**78**: 209–261.

Rafinesque, C.S. 1815. *Analyse de la Nature, ou tableau de l'Univers et des Corps Organisés*. Pp. 136–149. Palermo.

Rapp, W.L. 1827. Über das Molluskengeschlecht *Doris* und Beschreibung einiger neuer Arten desselben. *Nova Acta Academiae Caesareae Leopoldino-Carolinae Germanicae Naturae Curiosorum*, **13**: 516–522, pls. 26–27.

Riedl, R. 1983. *Fauna und Flora des Mittelmeeres*, ed. 3. 836 pp. Parey, Hamburg.

Rumphius, G.E. 1705. *D'Amboinsche Rariteitkamer* . . . . xliii, 340 pp. Halma, Amsterdam.

Sabelli, B., Giannuzzi-Savelli, R. & Bedulli, D. 1990. *Catalogo annotato dei Molluschi marini del Mediterraneo*, vol. 2. 498 pp. Società Italiana di Malacologia, Bologna.

Schmekel, L. 1968. Die Gattung *Doris* (Gastr. Nudibranchia) im Golf von Neapel. *Pubbliccazione della Stazione Zoologica di Napoli*, **36**: 167–187.

Schmekel, L. & Portmann, A. 1982. Opisthobranchia des Mittelmeeres. Nudibranchia und Sacoglossa. *Fauna e Flora del Golfo di Napoli*, **40**: 1–410.

Seaward, D.R. 1990. *Distribution of the marine molluscs of north west Europe*. 114 pp. Nature Conservancy Council.

Seba, A. 1735. *Description exacte des principales curiositez naturelles du magnifique cabinet d'Albert Seba*, vol. 2. 154 pp. Janssonio-Waesbergios, Wetstenium & Smith, Amstelaedami.

Smith, E.A. & Heppell, D. 1991. *Check list of British Marine Mollusca.* 114 pp. National Museums of Scotland, Edinburgh.

Taslé, P. 1870. *Faune malacologique marine de l'Ouest de la France. Catalogue des Mollusques observés dans l'Atlantique Français, depuis les parages de Brest jusqu'aux frontières d'Espagne.* 144 pp. Mareschal, La Rochelle.

Thiele, J. 1931. *Handbuch der Systematischen Weichtierkunde*, Bd. 1. 778 pp. Fischer, Jena.

Thompson, T.E. 1980. Jamaican opisthobranch Molluscs II. *Journal of Molluscan Studies*, 46: 74–99.

Thompson, T.E. & Brown, G.H. 1984. *Biology of Opisthobranch Molluscs*, vol. 2. 229 pp. The Ray Society, London.

Weinberg, S. 1994. *Découvrir l'Atlantique, la Manche et la mer du Nord.* 384 pp. Nathan, Paris.

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